

# Notes - Finding Solutions by Graphing

Solutions = x-intercepts (where the graph crosses the x-axis)

They are also called roots or

Zeros because they happen where  $y=0$ .

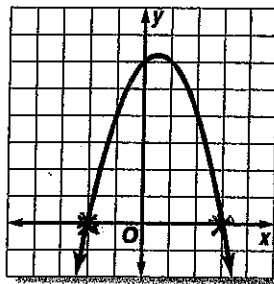
Example of finding solutions by graphing:

The graph of the quadratic function  $f(x) = -x^2 + x + 6$  is shown at the right. Use the graph to find the solutions of the quadratic equation  $-x^2 + x + 6 = 0$ .

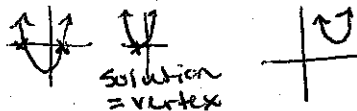
Just find the x-intercepts!

The solutions are  $(-2, 0)$  and  $(3, 0)$

You could also write this as  $x = -2, 3$   
but NOT  $(-2, 3)$

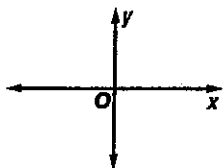


■ Quadratic functions can have 2, 1, or no real solutions

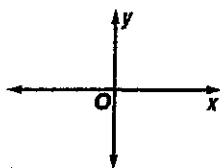


Sketch a graph to illustrate each situation.

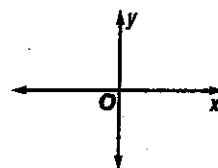
a. A parabola that opens downward and represents a quadratic function with two real zeros, both of which are negative numbers.



b. A parabola that opens upward and represents a quadratic function with exactly one real zero. The zero is a positive number.



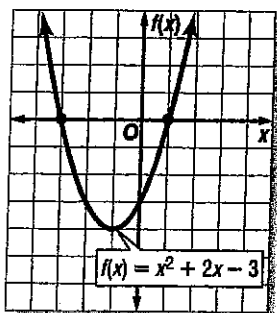
c. A parabola that opens downward and represents a quadratic function with no real zeros.



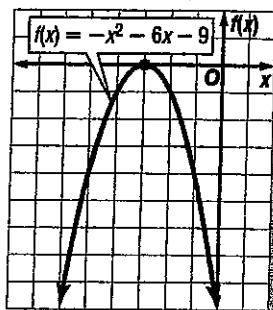
## Solving Quadratic Equations By Graphing

Use the related graph of each equation to determine its solutions.

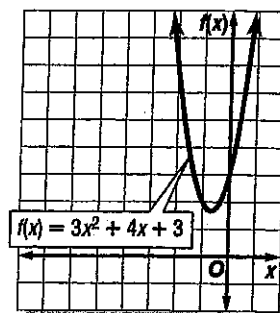
1.  $x^2 + 2x - 3 = 0$



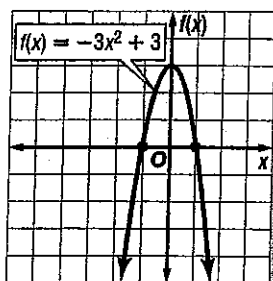
2.  $-x^2 - 6x - 9 = 0$



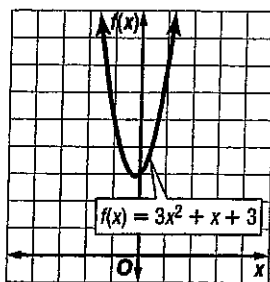
3.  $3x^2 + 4x + 3 = 0$



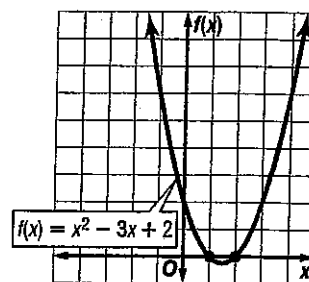
4.  $-3x^2 + 3 = 0$



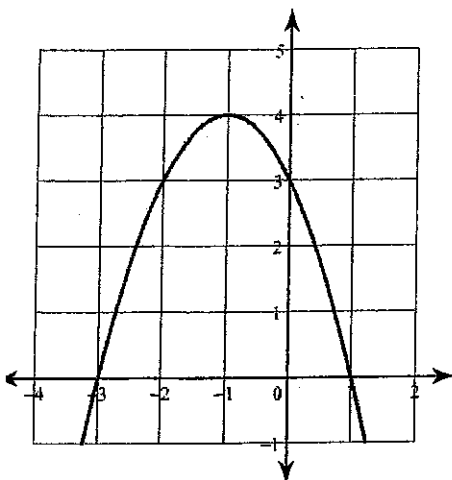
5.  $3x^2 + x + 3 = 0$



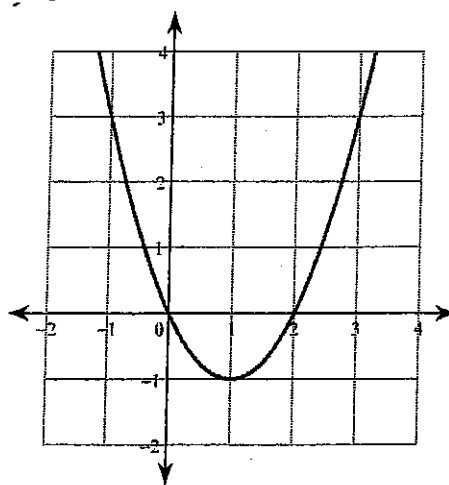
6.  $x^2 - 3x + 2 = 0$



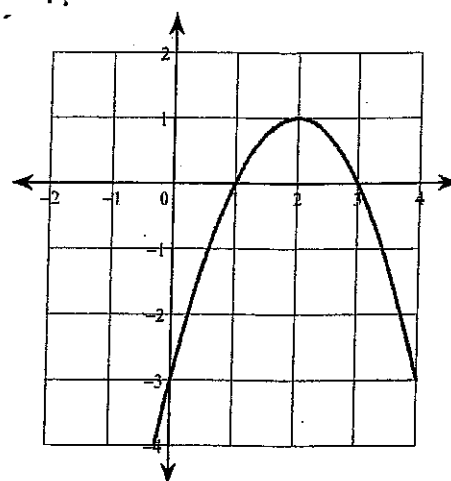
7.



8.



9.



## Using the Calculator to find solutions by graphing

- IF the function doesn't have neat, tidy integer value solutions, then you need to find the exact solutions with your calculator.

### Steps

- ① Plug the equation into  $Y=$
- ② Make sure that you can see the solution(s) and change your WINDOW if necessary.
- ③ Go to 2<sup>nd</sup> TRACE (the Calculate screen)
- ④ Choose 2: zero
- ⑤ Move the blinky to the left of the solution you're trying to find and press enter. (Left Bound?)
- ⑥ Move the blinky to the right of the solution you're trying to find and press enter. (Right Bound?)
- ⑦ Move the blinky to where you think the solution is and press enter (Guess?)

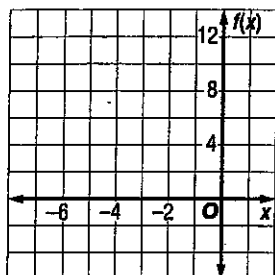
Ta-da! The zero ( $x = y = 0$ ) appears at the bottom.

- ⑧ If you need to find more than one solution, repeat steps 3-7.

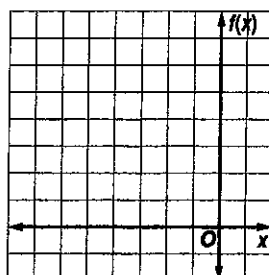
Use calculator to graph  
and find the exact solutions.

Solve each equation by graphing.

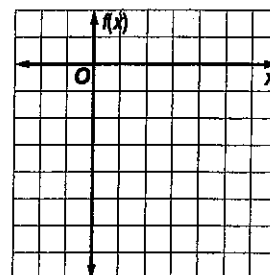
10.  $-2x^2 - 6x + 5 = 0$



11.  $x^2 + 10x + 24 = 0$

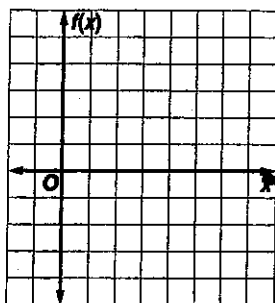


12.  $2x^2 - x - 6 = 0$

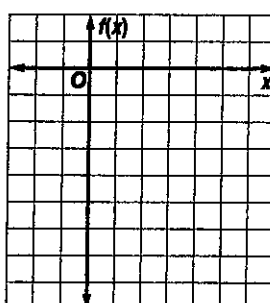


Solutions ( , 0 )  
and ( , 0 )

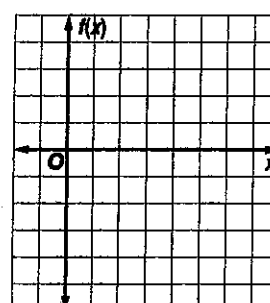
13.  $x^2 - 6x + 5 = 0$



14.  $-x^2 + 2x - 4 = 0$

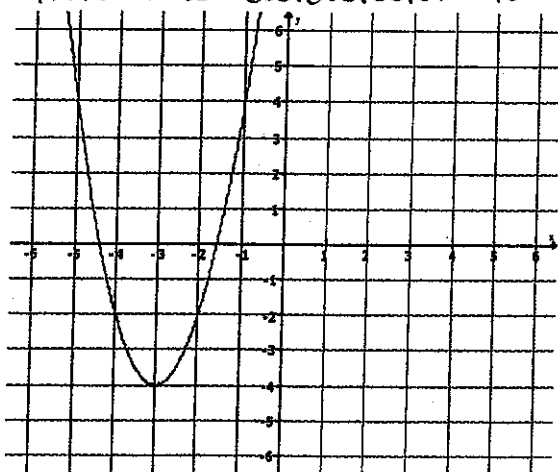


15.  $x^2 - 6x + 4 = 0$

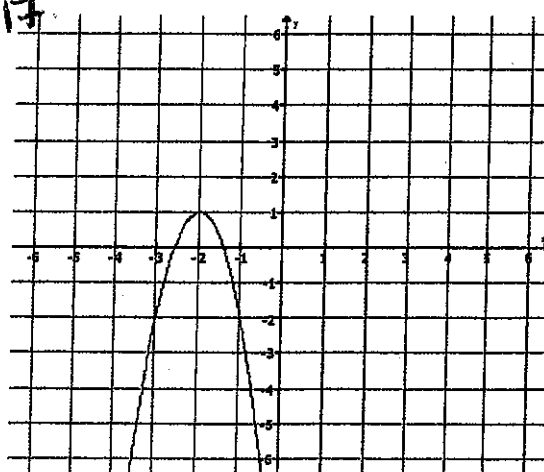


Write the equation from the graph, then put the equation  
into the calculator to find the exact solutions.

16.



17.



Equations:  $y =$  \_\_\_\_\_

$y =$  \_\_\_\_\_